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November 7, 2004
ISR-1-04-137

Dr. Andrew Christensen
Northrop Grumman Space Technology
One Space Park, R9-1914
Redondo Beach, CA 90278

Dear Andy,

The Sun-Earth Connections Subcommittee met in Washington on November 3-5. We had a very busy and productive meeting. A copy of the agenda is attached to this letter.

Since we are aware of the upcoming reorganization of the advisory committee structure, one focus of our meeting was an effort to increase our understanding of the scope and objectives of the Earth Sciences programs, with which Sun-Earth Connections is being merged. We heard presentations by Mary Cleave, Jack Kaye, Greg Williams, and Gordon Johnston that were very helpful in introducing to us the breadth of important activities going on within the Earth Sciences effort. We look forward to discovering and pursuing the opportunities for scientific interchange and collaboration that will be afforded by the new organizational structure. In a similar spirit, we also took a look at what aspects of the existing structure have been helpful to SECAS in carrying out our designated tasks. One thing we have found particularly valuable is our MOWGs, which are essentially sub-subcommittees that provide us with in-depth professional expertise and insights into more narrowly focused parts of the full SECAS purview. One of the findings described below is that a similar structure would also probably well serve the successor to SECAS.

Another important activity at our meeting was a discussion of the ongoing roadmapping process. We heard a presentation by Todd Hoeksema, the chair of our legacy roadmapping committee, on their progress and plans. We were quite pleased with the careful and comprehensive approach they are taking, and we expect the outcome to be a very positive and progressive guide to the future program. In our discussion of the overall process, however, concerns were raised about the interfaces between the various roadmapping teams; specifically, we are concerned that some research areas that do not fit neatly into the defined boxes may fall between the cracks. This concern led us to our second finding below.

We greatly appreciate the time that Al Diaz spent with us during this meeting. We had a useful and positive interchange of thoughts. In our discussion, he asked us to give him ideas on how we might contribute to making the new structure work effectively, especially in pursuit of the Exploration Initiative objectives. Our response is indicated in our finding number 4. Specifically, we intend to use the roadmap process to delineate the numerous ways in which SEC science can contribute to NASA's Exploration Vision, exploiting unique capabilities that emerge from our foundation of basic scientific understanding of the workings of the Sun-Earth (indeed, Sun-Planets) system. And, because there remain many unanswered questions (some known, some as yet unknown) about this complex system and its importance for human and robotic exploration activities, we must also continue to strengthen the underlying foundation of fundamental physical

understanding.

Finally, I would like to call attention to our finding #5. During the course of the meeting, we learned that there may be a way at hand to address our long-standing need for relatively inexpensive access to space, namely in the excess lift capacity of several of the launch vehicles that are already scheduled for NASA payloads. We would very much like to see this possibility explored.

Our full set of findings is attached.

This was the last SECAS meeting for several of our members, whose terms on the committee expire this month (Jeff Forbes, Jim Klimchuk, Dave Klumpar, Dana Longcope, and Bill Matthaeus). We very much appreciate the time and effort they have devoted to this important community service.

Best regards,

Michelle F. Thomsen
SECAS chair

cc Al Diaz, Mary Cleave, Richard Fisher

attachments

SECAS Findings from 3-5 November 2004 Meeting
Agenda for 3-5 November 2004 SECAS Meeting

Summary of SECAS Findings, 3-5 November 2004

1. *Advisory Committee Structure*

Issue: NASA's new Science Mission Directorate is aligning its advisory committee structure with its divisions, including the Earth-Sun System Division. In response to a question from SECAS, Mr. Diaz said that he welcomed comments from the existing committees on how the new structure might function most effectively.

Background: SECAS has been well served by discipline-specific MOWGs (Management Operations Working Groups), the chairs of which also serve on SECAS. Each MOWG provides grass-roots information and specific findings that SECAS integrates with other MOWG findings and uses to inform its own discussions and findings. The in-depth expertise of the MOWGs complements and supports the diverse membership of SECAS; such a resource is likely to be even more valuable for its broader-scope successor committee.

Recommendation: SECAS recommends that the Earth-Sun System Division retain standing working groups, similar to MOWGs, that report to the Earth-Sun System Subcommittee.

2. *Coordination of Parallel Roadmapping Activities*

Issue: There is a need to assure effective communication between Agency Strategic Roadmapping activities. There are three specific concerns: timing, smooth interfaces between roadmaps, and coordination and exploitation of interdisciplinary opportunities.

Background: Within the new Science Mission Directorate, we are now engaged in an Agency Strategic Roadmap activity. Thirteen strategic roadmap teams and sixteen capability roadmap teams are being formed, in general each responsible for an individual NASA Objective. Sun-Solar System Connection (S3C) science is defined by one of these objectives and is relevant to at least two other science roadmaps and a number of capability roadmaps.

Recommendation: So that roadmaps will be compatible, consistent, and exploit interdisciplinary opportunities, we recommend that there be effective and timely communication among the roadmapping teams (both legacy and APIO), e.g., via designated liaisons between roadmapping activities.

3. *Constitution of the Sun-Solar System Roadmap Team*

Issue: There is presently a disciplinary imbalance within the membership of the legacy SSSC roadmap committee that presents a gap in expertise in addressing some aspects of Sun-Solar System physics.

Background: A discipline-balanced team had initially been selected. However one member with heliospheric research expertise had to step down, leaving the important area of heliospheric physics with inadequate representation in the planning process.

Recommendation: We recommend that one or two additional members from the heliospheric community be appointed to the legacy roadmap team to ensure that there is appropriate coverage of this area.

4. *Supporting the Exploration Initiative on A Foundation of Basic Understanding*

Issue: There is a strong imperative to maintain progress in basic understanding of the connected Sun-Earth system to enable support of the Exploration initiative and future initiatives.

Background: Associate Administrator Al Diaz briefed SECAS on the new Earth-Sun System Division, outlining the Administration's commitment to continuing SEC's strong space science research program, and emphasizing the potential for our discipline to contribute to the scientific basis for Exploration, as well as the potential for Exploration activities to afford opportunities for enhancing scientific research and discovery. He encouraged SECAS to give him feedback on how SEC science can best contribute to the new vision. We were pleased to receive his enthusiastic support for the discovery nature of our research and for the SEC perspective of the fully connected Sun-Earth system. Through the present roadmapping process, we are reviewing our scientific activities to formulate a coherent strategy to engage in the Exploration Initiative. SECAS believes that our community has much to contribute: Comprehensive knowledge and understanding of solar activity, the interplanetary medium, heliospheric energetic particles, and the environments of planets and moons are required for human safety, spacecraft design, and mission planning related to human and robotic exploration of the solar system. These potential contributions clearly build upon the foundation of basic understanding that is being built through a diverse set of programs of scientific exploration: the Solar-Terrestrial Probes line, the LWS Program, the Explorer and Rocket Programs, as well as Theory, Guest Investigator, and Supporting Research and Technology Programs. Such a foundation is also the best way to ensure that this discipline will be able to support future initiatives, as yet unimagined. Therefore, the challenge to our present strategic planning effort is how to exploit and expand existing knowledge to support the Exploration Initiative, while continuing the fundamental exploration needed to build a solid foundation of basic understanding of the connected system of the Sun, Earth, and planets.

Recommendation: SECAS urges the Science Mission Directorate to be mindful of the need to maintain and strengthen a broad foundation of basic understanding in order to support effectively the Exploration vision and other future initiatives.

5. *Effective Utilization of Excess Payload Capability on NASA Launches*

Issue: Access to space is limited and costly. Small and moderate size scientific satellites are particularly difficult to manifest owing to the often-prohibitive cost of obtaining a dedicated launch vehicle. A standard adapter to accommodate secondary payloads within the EELV fairing could alleviate this inefficiency and open the door to more frequent launch opportunities for this class of satellites.

Background: The lack of ready access to space for low cost has resulted in suspension (e.g., UNEX) or the near cancellation (e.g. ST-5) of scientifically compelling missions. At the same time, scientific spacecraft being launched to Earth orbit are often smaller and lighter than the launch booster capacity, resulting in potential underutilization of precious launch capability. NASA has no standard secondary payload adapter for use on US boosters. This is in contrast to the European Ariane launcher, where every launch carries secondary payloads to utilize excess capability. We understand that the DoD Space Test Program has a secondary payload adapter for the EELV under development. However, as far as we know, NASA neither participates in this development, nor has initiated development of its own secondary payload accommodation.

Recommendation: SECAS urges NASA to take an active role in the development of a generic capability to utilize excess payload capacity on launch systems when the primary NASA payload does not require the entire capacity, and we request a report on the feasibility of such a development for discussion at our next meeting.

6. *International Heliophysical Year*

Issue: NASA is encouraged to participate in the programs commemorating the 50th anniversary of IGY1957.

Background: Worldwide campaigns in geophysics like the International Polar Years in 1888 and 1932 and the International Geophysical Year in 1957 have left a rich legacy of new science discoveries and expanded geophysical measurement capabilities founded on international cooperation. They play a very important role in the development of space science as a discipline and in public recognition of our accomplishments. On the 50th anniversary of the last IGY, several new worldwide campaigns are being planned – the International Polar Year (IPY) 2007, the International Heliophysical Year (IHY) 2007 and the Electronic Geophysics Year (eGY) 2007. As in past campaigns, these efforts hold the potential for driving new and innovative ways of viewing and modeling the Sun, heliosphere, geospace and planetary systems that make use of data from multiple satellite missions and distributed sets of ground-based sensors, but place new emphasis on the role of theory, global modeling and data assimilation in producing new knowledge about the global Sun-Earth system behavior. As in previous IGYs, there is a strong emphasis on the Sun-Earth interaction but, in contrast to previous efforts, parallel investigations are envisioned in Sun-planet system research.

Recommendation: SECAS recommends that the Science Mission Directorate look into ways to help make the coming IGY programs a success.

AGENDA - SECAS – NOVEMBER 3-5, 2004
NASA HEADQUARTERS

WEDNESDAY, 3 NOVEMBER 2004: Location: HQ MIC6 (6H46)

0815	Meeting Room Open, Coffee	
0830	Welcome	Michelle Thomsen
0840	Earth-Sun Systems Division	Mary Cleave
0900	Sun-Solar System Connection Update	Richard Fisher
1000	Sun-Solar System Connection Mission Update	Charles Gay
1015	Break	
1030	MOWG reports (15 min each) Living with a Star Geospace Solar-Heliospheric	 Glenn Mason Jim Clemmons Steve Suess
1100	Future Advisory Committee Structure	Greg Williams
1130	Introduction to the Earth Science Program	Jack Kaye

1200	Group Lunch: Science Presentation

1300	ROSES-2005	Paul Hertz
1315	Solar Terrestrial Probes Update	Eric Christian
1345	Agency Strategic Planning and the SSSC Roadmap	Barbara Giles
1415	Break	
1430	Sun-Solar System Connections Roadmap Update	Jeff Forbes and Todd Hoeksema
1530	Solar System Exploration Roadmap Activities	Nathan Schwadron
1545	Earth Science Roadmap Activities	Gordon Johnston
1600	Roadmap Discussion	Committee
1700	Adjourn	
1830	Group Dinner	

THURSDAY, 4 NOVEMBER 2004: Location: HQ PRC (9H40)

0815	Meeting Room Open, Coffee	
0830	International Heliophysical Year/Electronic Geophysical Year	Joe Davila
0900	Sounding Rocket Program Review	Gerry Daelemans
0930	Living with a Star Update	Lika Guhathakurta
1000	Break	
1015	Project Columbia	Tsengdar Lee
1045	Magnetosphere Constellation	Alex Klimas

1115	Lunch on your own – e.g., cafeteria or grill on 1st floor/café on 9th floor

	MOVE TO HQ AUDITORIUM	
1200	Science Presentation in the auditorium	George Siscoe
	RETURN TO MEETING ROOM	
1315	Discipline Scientist Roundtable	HQ Discipline Scientists
1400	Science Missions Directorate Update	Al Diaz
1500	Break	
1515	Discussion and Writing Assignments	Committee
1700	Adjourn	
1830	Group Dinner	

FRIDAY, 5 NOVEMBER 2004: Location: HQ PRC (9H40)

0815	Meeting Room Open, Coffee	
0830	Committee Writing Time	Committee
0915	Review of Findings	Committee
1030	Break	
1045	Review Findings with Fisher/Cleave	Committee/Fisher/Cleave/Division
1145	Committee roundtable	Committee
1200	Adjourn	

END OF MEETING